

REMARKS

In response to the Official Action dated September 23, 2002, Applicant amends the application and requests reconsideration. In the Amendment, claims 13, 17 and 18 have been amended, and claims 30-45 have been added. No new matter has been added. Claims 13-45 are now pending and under examination.

Claim 18 was rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter of which Applicant regards as the invention. Applicant has amended claim 18 and believes that the amendment to claim 18 overcomes this rejection.

Claims 13-29 were rejected under 35 U.S.C. §103(a) as being unpatentable over *Nemeth* (U.S. Patent 5,360,536) in view of a number of references. For the following reasons, Applicant respectfully requests reconsideration and withdrawal of this rejection.

Claims 13-29 recite a number of patentable features that are not disclosed or suggested by the cited references. For example, in each of claims 13-29, the process of desulfurization of engine fuel is carried out onboard a motor vehicle. This feature is not taught by any of the cited references.

This feature of the claimed invention provides various advantages. For example, an adsorption unit onboard the motor vehicle makes it possible to use desulfurized fuel only when desulfurized fuel is desired. At other times regular fuel is used. For example, if desulfurized fuel is desired only when the engine is in the lean-burn mode, then the fuel is desulfurized only when the engine is in that mode. In the prior art, on the other hand, an extra fuel tank must be installed in the vehicle to carry desulfurized fuel. Although the vehicle can be made to carry and use only desulfurized fuel even when the engine is not in the lean-burn mode, it is highly undesirable because desulfurized fuel costs more.

With regard to this feature, the Office Action stated that it would have been obvious to have placed the fuel purifier of *Nemeth* onboard a ship or other

motorized vehicle to render the same mobile, as suggested by either or both DE 373 321 (should be DE 3 733 321) or *Inoue* (U.S. Patent 3,616,375).

For the reasons discussed below, Applicant respectfully disagrees with the characterization of DE 3 733 321 and *Inoue* in the Office Action. With regard to DE 3 733 321, firstly, the reference discloses only a refinery. It does not disclose or suggest desulfurization of fuel at all. Second, the reference does not disclose or suggest that the refined products be used by the ship, for example, as engine fuel, while in the claimed invention engine fuel for used by the motor vehicle is desulfurized. In other words, the reference does not disclose that the fuel used by the ship is processed onboard the ship. Third, the reference only discloses the use of a refinery on a ship, not on a motor vehicle. A motor vehicle is defined as "a self-propelled wheeled conveyance, such as a car or truck, that does not run on rails" (see The American Heritage Dictionary of the English Language, Fourth Edition, by Houghton Mifflin Company). Under this definition (or any other definition that Applicant's counsel could find), a ship is not a motor vehicle. Therefore, for any one of the three reasons, the description of DE 3 733 321 in the Office Action is inaccurate, and it cannot provide the motivation needed to place an adsorption unit onboard a motor vehicle to desulfurize engine fuel.

With regard to *Inoue*, first, the reference only mentions a tanker or a vessel but does not mention a motor vehicle. According to the above-discussed definition, a tanker or a vessel is not a motor vehicle. Second, the reference does not disclose or suggest that the fuel used by the ship be desulfurized on the ship. Therefore, for any one of the two reasons, the description of *Inoue* in the Office Action is inaccurate, and it cannot provide the motivation needed to place an adsorption unit onboard a motor vehicle to desulfurize engine fuel.

In addition to the feature discussed above, claims 13-29 also recite other features that are not disclosed or suggested by the cited references. The following are some examples of the patentable features. Since those features are similar to features recited in the new claims, the patentability of the new claims is discussed in connection with those examples.

First, claim 28 recites that nitrogen oxides are removed by using fuel desulfurized onboard the motor vehicle as a reducing agent. New claim 35 recites that fuel of reduced sulfur content is used as a reducing agent for deNOxing a catalytic converter of the motor vehicle. Those features are not disclosed or suggested by any of the cited references. In fact, the Office Action does not even allege that those features are taught by the cited references.

Second, claim 29 recites the regeneration of the catalytic converter with fuel desulfurized onboard the motor vehicle. New claim 39 also recites this feature. The Office Action does not allege that this feature is taught by the cited references.

Third, claim 27, as well as new claim 30, recite regeneration of adsorption material using engine oil or engine coolant. The Office Action does not allege that this feature is taught by the cited references.

Additionally, new claim 32 recites using the fuel of reduced sulfur content as engine fuel only when the engine is in a lean-burn mode. The Office Action does not allege that this feature is taught by the cited references.

However, the Office Action, without providing any specific reasons, stated that claims 14-17 and 19-29 are either shown or suggested by the cited references, or would have been obvious as well known and conventional expedients. Applicant respectfully submits that this rejection is improper because omnibus rejections are prohibited by the MPEP (Section 707.07(d)).

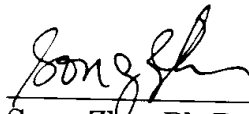
In view of the above discussion, claims 13-29, as well as the new claims, are patentable over the cited references.

In light of the foregoing remarks, this application is considered to be in condition for allowance, and early passage of this case to issue is respectfully requested. If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #225/49816).

February 20, 2003

Respectfully submitted,



Song Zhu, Ph.D.

Registration No. 44,420

Donald D. Evenson

Registration No. 39,085

CROWELL & MORING, LLP
Intellectual Property Group
P.O. Box 14300
Washington, DC 20044-4300
Telephone No.: (202) 624-2500
Facsimile No.: (202) 628-8844
DDE:SZ:tlm (038738.49816US)

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 13, 17 and 18 have been amended as follows:

13. (Amended) A process for the desulfurization of an engine fuel onboard a motor vehicle, comprising:

contacting an engine fuel comprising sulfur-containing components with a selective liquid-phase adsorption material comprising an oxide of Al, Mg, Si, or Ti that is doped with Ag; and

separating the sulfur-containing components from the engine fuel, thereby obtaining a low-sulfur fuel for use by the motor vehicle.

17. (Amended) A process [according to Claim 13] for the desulfurization of an engine fuel onboard a motor vehicle, comprising:

contacting an engine fuel comprising sulfur-containing components with a selective liquid-phase adsorption material, wherein the adsorption material is a biogenic material; and

separating the sulfur-containing components from the engine fuel, thereby obtaining a low-sulfur fuel.

18. (Amended) A process [according to Claim 13] for the desulfurization of an engine fuel onboard a motor vehicle, comprising:

contacting an engine fuel comprising sulfur-containing components with a selective liquid-phase adsorption material, wherein the adsorption material is a biogenic material, wherein the biogenic material comprises an enzyme or a microorganism; and

separating the sulfur-containing components from the engine fuel, thereby obtaining a low-sulfur fuel.